service in many ways. The volumes altogether are very readable, and throughout the statements are usually reliable. Should a second edition be required it might possibly be improved by the addition of a "table of contents." W. H. W.

THE GERM THEORY

The Germ Theory Applied to the Explanation of the Phenomena of Disease. "The Specific Fevers." By T. Maclagan, M.D. (London: Macmillan and Co., 1876.)

IN his preface the author states that "one object which he has in view is to rescue the germ theory of disease from a false and misleading position, and to give to it its true and legitimate standing as a pathological question." The subject discussed is whether the propagation of germs in the system can produce specific fevers. He believes it can, and assumes that all contagia are living organisms, probably albuminous, reproducing their kind, living for a considerable period, speedily perishing when freely exposed to the atmosphere, and so minute as to elude the highest powers of the microscope.

If, however, the particles in sheep-pox, small-pox, and vaccine, be the infecting matter, they are easily seen by the microscope, and ought therefore to be found in the blood, but such is not the case.

Dr. Maclagan holds that "all microzymes are not contagia, but all contagia may be microzymes." The fact that the contagia fluids are most potent when fresh, and that their virulence diminishes as bacteria increase in them is explained by saying that disease-germs are more minute organisms than bacteria, and are the food on which bacteria live. According to this view, bacteria not only do not constitute infection, but destroy it.

Dr. Maclagan says "that the chief action of an organism on its environment is the consumption of nitrogen and water. A disease-germ is a parasite, and requires a special *nidus* as well as nitrogen and water; the parasite finds a *something* in its *nidus*—the second factor—the parasite being the first. Without this second factor no bad result follows the reception of the contagium." Different periods of incubation are accounted for by the varying amount of the second factor and the number of germs imbibed; incubation itself by germ-growth and reproduction; and the onset of the symptoms by the germs becoming mature.

The consumption of nitrogen by the contagium particles causes wasting of the tissues, *i.e.*, the organisms eat the albumen intended to nourish the body. They also drink largely of water from the liquor sanguinis, which, being rich in soda, explains why soda-salts are often absent from the excretions during fever. The same retention of soda-salts, however, often happens in acute pneumonia, which has no relation to infectious disease.

Increased elimination of urea is explained thus:—"The increased consumption of liquor sanguinis by the contagium particles leads to increased formation of retrogressive albumen and of urea." It seems by this that contagium particles have livers and kidneys, and excrete urea. Diminished excretion of urea is held as "due to consumption by the contagium particles of the water requisite to enable the kidneys to perform their excretory function." What then, we ask, becomes of the water consumed by the contagium particles? Do their kidneys excrete urea in excess with limited water, while those of the patient are unable to do so? or do the contagium particles not consume water when the urea is increased as well as when it is diminished? In fever the quantity of water drank by the patients is very great, but that, according to Dr. Maclagan, is because the quantity of contagium particles is also very great. We find, however, the same symptoms in symptomatic fevers, with no contagium particles present, and we have great difficulty in believing that ultra-microscopic organisms in a person's blood could consume several tumblerfuls of water in twenty-four hours.

The heat of specific fevers is partly ascribed to the propagation of the contagium causing increased consumption of tissue. But increase of living matter causes the disappearance of heat, not its production. Again, the author states that the fecundation of the organisms may be accompanied by an elevation of temperature analogous to that which occurs under similar circumstances in other organisms.

As regards treatment, at page 163 the following occurs: "If we were to bleed, to purge, to give antimony to, or even *simply to withhold food and water* from, all the cases of typhus and enteric fever which occur, there can be no doubt that we should find the mortality from those diseases greatly increased." Dr. Maclagan is right here, for by *simply withholding food and water*, there can be no doubt that he would greatly increase the mortality by starving his patients to death. He, however, believes that fever patients should be supplied with nitrogen and water to compensate for what the organisms consume.

The cessation of the fever and its specificity are attributed—the first, to the organisms, as parasites, requiring a special nidus which contains a suitable pabulum, and when the latter is exhausted the fever ceases; the second, to a local lesion in the *nidus*, which is the part where fecundation of the organism takes place. In small pox this *nidus* and lesion is in the skin, in typhoid in the bowels, and so on. It is well-known, however, that many medicines act on special parts of the body, and yet we do not think of calling them parasites which require a special *nidus*. The author gives many other plausible, and some very unusual explanations of febrile phenomena by means of the germ theory, all of which, we believe, are far more clearly and rationally explicable on the physico-chemical theory. The writing of this book must have cost Dr. Maclagan much trouble. We have read it very carefully, and commend the author's honesty in stating his views, but question if the work will go far in realising the object for which it was ostensibly written.

OUR BOOK SHELF

A Manual of Cinchona Cultivation in India. By George King, M.B., F.L.S., Superintendent of the Royal Botanical Garden, Calcutta, and of Cinchona Cultivation in Bengal. (Calcutta, 1876.)

THIS manual is another contribution to the numerous books, papers, and articles that have appeared of late years on the subject of cinchona. Varied as these contributions have been, and valuable each one in itself, this manual brings together much that is useful, not only on

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the scientific aspect of the subject, but also on the harvesting of the bark crop in India, as well as on the commercial value of the Indian cinchona plantations. The manual will probably find its largest circulation amongst owners of land who have embarked in the cultivation of cinchona as a commercial enterprise, or those who intend doing so, Chapter iv. being devoted entirely to cultivation: and this part of the subject is treated of very fully; the author giving the various details of suitability of climate, temperature, rainfall, elevation, soil, drainage, &c., together with the more practical operations of preparing the ground, sowing seeds, propagation, planting, and other matters of a similar character, which, from the nature of Dr. King's position as superintendent of the Government cinchona plantations, must be trustworthy, if not from his own practical experience, certainly from the fact of his being able to command the opinions of the best men in this important branch. The same may be said of Chapter v., on the "mode of harvesting the bark crop." Turning to Chapter vii. on the "local manufacture of a cinchona febrifuge," we come to what is interesting and important to the whole community, namely, some of the practical results of the cinchona introduction into India, in the production of a cheap but efficient febrifuge. This preparation, which Mr. Broughton, the Government quinologist calls amorphous quinine, consists of the total alkaloids of cinchona bark, in the form of a non-crystalline powder, mixed to some extent with the resin and red colouring matter so abundant in red bark. "This alkaloid," we are told, "has been accepted by the medical profession in the Madras Presidency, as a remedy in malarious fevers, scarcely, if at all, inferior to quinine." About 600 lbs. of this substance was produced in the Neilgherry factory up the end of the year 1872-73, but the process of manufacture was found too costly, and the factory was accordingly closed. A more simple process was commenced in Sikkim, by Mr. Wood, who arrived in India in 1873, and by this process at the present time, about a ton per week of dry red bark is being worked up. The bark, hitherto so utilised, has been chiefly derived from thinnings and prunings, undertaken from time to time in the interests of the trees. By the end of the current financial year (1875-76) about 32,000 ounces of alkaloid will have been turned out. Next year a much larger quantity will be yielded. It has been calculated that of this efficient febrifuge there can soon be yielded from three to four tons annually, at a cost of rather less than one rupee per ounce.

Some interesting appendices are attached to the Manual—one shows the stock of trees in the Neilgherry cinchona plantation, another the stock in the Sikkim plantations, another the meteorology of the same plantations, and the last one gives the opinions of medical men holding important positions in India, on the efficacy of the cinchona febrifuge. With the manual are also issued three extra pages, descriptive of the process at present used for manufacturing the above substance, by Mr. C. H. Wood, the Government quinologist. J. R. J.

Die Euganeen. Bau und Geschichte eines Vulkanes. Von Dr. Ed. Reyer. (Wien, 1877.)

THIS is Dr. Reyer's first publication, and we gladly acknowledge it to be a very promising one. The subject, a minute geological treatise of the Euganean Mountains near Padua, illustrated by a well-drawn map, hardly calls for a lengthy notice on our part, but the little work is attractively written, and testifies to the complete mastery the author possesses over his subject. He minutely describes the structure of these mountains, then dwells upon the consequences he draws from this regarding their geological history, and raises before the eyes of the reader an interesting picture of times long past, and of forms long extinct. Dr. Reyer's language has the advantage of being clear and to the point, and free from all unnecessary ornament. We have pleasure in recommending the book to our readers, and hope that it may soon be followed by another production from Dr. Reyer's pen.

Die Erde und ihre Völker: ein geographisches Hausbuch. Von Friedrich von Hellwald. Erster Band. Zweite Auflage. (Stuttgart: Spemann, 1877.)

THIS work has met with deserved popularity in Germany. Dr. Hellwald is known as one of the most accomplished living geographers, and is well fitted to undertake the compilation of a work like the present. It will, we believe, be completed in two volumes, the volume before us dealing with America and Africa. The author follows to some extent the method of Reclus in his *magnum opus*, though, of course, on a smaller scale. He takes the great divisions of the land and water one after another, and in a thoroughly interesting and clear style, summarises all that is known of them on the basis of the latest discoveries, and under a variety of well-selected heads. The work, so far as we have tested it, is up to the latest date, and we know of no more trustworthy, interesting, and handy compendium of geographical information. Some of the illustrations might bear improvement, especially in the case of North America, where, we think, a freer use might have been made of the magnificent illustrations in the U.S. Survey publications. On the whole, however, the work is a valuable "family book," as it is meant to be, and we should think would prove of considerable service to teachers of geography. We have no doubt that many would welcome an English edition of the work.

LETTERS TO THE EDITOR

[*The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts. No notice is taken of anonymous communications.*]

Science Fellowships at Oxford

YOUR correspondent, Mr. Charles Wade, is an undergraduate of Magdalen College, and makes the very natural mistake of supposing that fellowships once assigned to natural science are, like the class of college prizes with which he is more familiar, namely, the scholarships, regarded by the colleges giving them as in a certain sense appropriated for future vacancies, to the subject which has once been connected with them. This is not the case, and accordingly your readers will find that Mr. Wade's enumeration of twelve fellowships, as assigned to natural science at Oxford, is erroneous, whilst the statement of "an Oxford Man" that only five fellowships are at this moment held as rewards for proficiency in natural science, is correct. From Mr. Wade's list must be removed the three Lee's readerships at Christ Church, which are not of the nature of ordinary fellowships, but are special foundations and enumerated by "an Oxford Man" with the professorships. Of the nine remaining on Mr. Wade's list, one at Merton does not exist, nor does that at Corpus, nor that at Pembroke, whilst that at Brasenose was not offered purely and simply for physical science. Hence there are but five fellowships at Oxford now held for natural science, or six if we count that at Brasenose.

Since I have no reason to ingratiate myself either with those who defend or those who attack the abuses of Oxford, I shall not imitate Mr. Wade, but sign myself SOCIUS

Spectra of Metalloids

IN a recent number of NATURE (vol. xv., p. 401) I gave a short abstract of a paper by Messrs. Angström and Thalen, on which I should like to make a few remarks. It is known that Plücker first drew attention to the fact that one body may have different spectra, and he seemed inclined to attribute these spectra to different allotropic states of the element. Later on, however, attempts were made to give another explanation of the phenomenon. It is against these attempts that Angström and Thalen chiefly protest in their paper. They use, however, the word element, in a different sense from that in which it is generally used. An elementary body, they say, can only have one spectrum. We are aware that bodies, as iodine and sulphur, can give two spectra, but then the band spectrum is due to an allotropic state, which, from a spectroscopic point of view, behaves

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